

SOME CAVE-DWELLING PSEUDOSCORPIONIDEA FROM AUSTRALIA AND NEW CALEDONIA

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SUMMARY

Eight species and subspecies of Australian and New Caledonian cave-dwelling Pseudoscorpionidea are treated and five of them are described as new: *Austrochthonius cavicola* (South Australia), *Morikawia trogliphila* (New Caledonia), *Pseudotyrannochthonius hamiltonsmithi* (Victoria), *Protochelifer naracoortensis* (South Australia), and *Protochelifer cavernarum* ssp. *aitkeni* (West Australia). *Ideobisium antipodum* (Sim.) from New Caledonia is redescribed.

The paper is based on a small, but very interesting collection of cave-dwelling species, made by E. Hamilton-Smith, P. Aitken, B. P. Moore, G. Sinclair, and J. Davidson in several caves of Australia and New Caledonia. Most of the species are new to science, because the cavernicolous fauna of Australia is poorly known at the present time. The holotypes of the new species are in the South Australian Museum, Adelaide, the paratypes in the Biospeological Collection of the same Museum and in the Museum of Natural History, Vienna.

Sathrochthonius tuena Chamberlin, 1962

Two nymphs, Punchbowl Cave, Wee Jasper, N.S.Wales, 22.VI.1963, B. P. Moore (BS0407), belong probably to this species, and many ♂♂ and ♀♀, Southern Limestone Cave, Jenolan, N.S.Wales species, ex Guano, 3.IX.1967, B. Dew leg.

Austrochthonius cavicola, sp. nov.

Fig. 1

Pale brownish yellow, chelicerae somewhat darker. Carapace as long as broad suborally, smooth, but reticulate in the hind corners and along the posterior border, with 18 bristles of approximately the same length, of which 6 are on the oral border and 2 on the posterior border; anterior border near the epistome, and epistome itself very roughly dentate, the epistome broken up almost entirely by these long and acute teeth. Eyes and eye-pigment absolutely wanting. Abdominal tergites 1 to 4 each with 4, those following with 6 bristles. Ultimate tergite with a pair of long tactile bristles. Palm of chelicerae with 5 bristles. Fixed cheliceral finger with about 8 teeth, movable one finely toothed, male without spinneret hump. Palpal femur a little longer than carapace, smooth. Hand narrow, 1.8 times as long as

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broad, sharply granulate dorsally. Chela 5.2 times longer than broad. Fingers 1.8 times longer than hand, straight, very densely toothed, the teeth obliquely truncate terminally. Fixed finger with about 60 teeth. Teeth of the movable finger smaller than those of the fixed one. Tactile seta *sb* of the movable finger nearly twice as far from *b* as from *st*, which is also twice as far from *sb* as from *t*. Coxae of first pair of legs broadly rounded orally and with two short bristles. Coxae of the second pair of legs with 4-5 finely dentate coxal spines. Intercoxal tubercle wanting. Genital opening of the male with 7 marginal bristles on each side.

Body: length ♂ 1.2 mm.

Carapace: length and breadth 0.37 mm.

Pedipalps: length femur 0.40 mm.; length hand 0.24 mm.; breadth hand 0.13 mm.; length fingers 0.44 mm.

Holotype—1 ♂, Cathedral Cave, Naracoorte, S. Australia, 1.IX.1962, E. Hamilton-Smith, dep. S. Austral. Mus. N196828.

This new cavernicolous species differs from the related *A. australis* Hoff by the absence of eyes, the absence of the two short lateral bristles on the posterior border of carapace, the shape of the epistome, the chaetotaxy of 4th tergal sclerite, the relatively slender chela and hand of pedipalps, more teeth on the fixed palpal finger, and fewer coxal spines.

***Morikawia trogliphila*, sp. nov.**

Fig. 2

Chelicerae intensively reddish brown, carapace and abdominal tergites olive-brown, pedipalps pale reddish yellowish-brown. Carapace scarcely shorter than broad anteriorly, strongly narrowed caudally, and neck-shaped constricted basally, smooth, but reticulate basally; with 16 long bristles and a pair of small preocular bristles; two of the anterior border bristles stand at the base of the epistome, the others before the eyes; two bristles on the posterior border. Epistomal process big and broad, tongue-shaped, narrowed distally, rounded terminally, and irregularly garnished with some fine prickles. Anterior eyes small, with their lens vaulted, posterior eyes reduced to pale spots. The two anterior abdominal tergites desclerotized, with the exception of a narrow transverse clasp, and finely transversely reticulate, the others smooth. Tergites 1-4 with 4, those following with 6 bristles. Ultimate tergite with 2 tactile bristles. Palm of chelicerae with 5 bristles and with fine prickles medially. Fixed cheliceral finger with a big tooth subapically, and with a row of small teeth proximally. Movable finger finely denticulate, without spinneret hump. Palpal femur about as long as carapace, smooth, with a row of 5 bristles medially, which gradually increase in length distally.

and with a long bristle dorsodistally. Hand relatively stout, 1.6 times longer than broad, with a single split-bristle mediodistally, which is comparatively short and reaches only to $\frac{1}{2}$ the length of the fingers. Chela 4.8 times longer than broad. Fingers twice as long as hand. Fixed finger with 16 rather short and broad triangular teeth, which are somewhat retroclinate, and with similar, but much smaller intercalary teeth. Movable finger with 8 similar teeth in the distal half and also with small intercalary teeth, and with a serrate or undulate lamina in the proximal half. Tactile setae in common position, *sb* of the movable finger halfway between *b* and *st*. Coxae of the first pair of legs with a stout digitate process orally, which bears a small bristle subapically. Coxae of the second pair of legs with a row of 6 broad and flat coxal spines, which are fringed terminally. Coxae of third pair of legs with 4, those of fourth pair with 3, discal bristles and with a longer apical bristle. Intercoxal tubercle wanting.

Body: length ♀ 1.1 mm.

Carapace: length 0.37 mm., breadth anteriorly 0.40 mm., posteriorly 0.27 mm.

Pedipalps: length femur 0.37 mm.; length hand 0.21 mm., breadth hand 0.13 mm.; length fingers 0.42 mm.

Holotype—1 ♀ Grotte de Ninrin-Reu, near Poya, New Caledonia, 26.XII.1965, E. Hamilton-Smith, dep. S. Austral. Mus., N196829.

The new species, which is, probably only trogloneous, is well distinguished from *M. zonata* Beier from the same island by the smaller body, by the big and broad epistome, which is terminally rounded and garnished with some fine prickles, by the much shorter palpal hand, which bears a single relatively short split-bristle mediodistally, by the much longer fingers, and by the less numerous coxal spines.

***Pseudotyranochthonius hamiltonsmithi*, sp. nov.**

Fig. 3

Carapace and abdominal tergites olive-brown, chelicerae and pedipalps pale reddish brown. Carapace a little broader than long, moderately narrowed caudally, densely alveolarly reticulate everywhere, with 14 long bristles and a pair of small and short preocular and mediolateral bristles respectively, the anterior border with 4, the posterior border with 2 bristles. Epistomal process prominent, broadly rounded, broader than long, thoroughly and densely covered with short prickles. Both pairs of eyes with vaulted lens. Abdominal tergites distinctly transversely reticulate. First tergite with 2, second and third with 4, fourth with 4 long and 2 short (lateral) bristles, the following tergites with 6 bristles of equal length. Ultimate

tergite without tactile bristles. Chaetotaxy of sternites irregularly, 9th and 10th sternite with 2 or 4 longer bristles, ultimate sternite with 2 bristles. Palm of chelicerae with 8 bristles, of which are the both lateral bristles very fine and short. Fixed cheliceral finger with 3 big teeth near the middle, and finely denticulate proximally. Movable finger with about one dozen denticles, the basal ones smaller, without spinneret hump. Palpal femur about 1.4 times longer than carapace, finely reticulate. Hand reticulate, 1.7 times as long as broad, weakly swollen dorsally. Tactile setae *ib* and *isb* situated dorsodistally, near the base of the fingers. Chela 5 times longer than broad. Fingers 1.8 times longer than hand, the fixed with about 20 mostly long and narrow, well spaced and erected teeth. Movable finger distally with 7-8 broadly triangular teeth, which are broader than long and shortly spaced, than with a shallowly serrate lamina. Tactile setae *sb*, *st*, and *t* of movable finger far distad, spaced nearly equidistantly, *sb* about 3 times further from *b* than from *t*. Coxae of first pair of legs with median corner boil-shaped, and with a row of 7-8 distally pennate coxal spines, which arise orally from an oblique ridge. Bisetose intercoxal tubercle present. Both tarsal joints of hind legs with a tactile bristle sub-basally.

Body: length ♀ 1.7-2 mm.

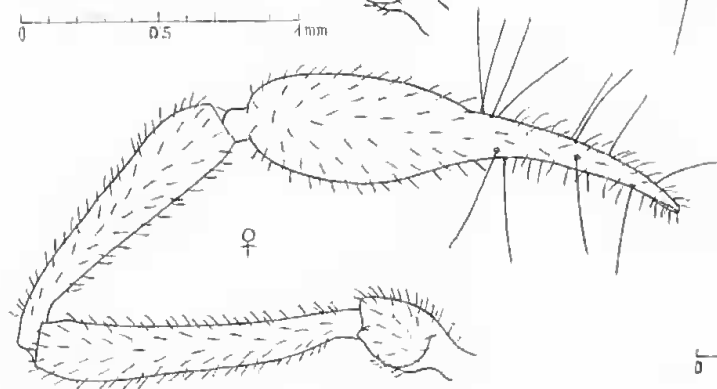
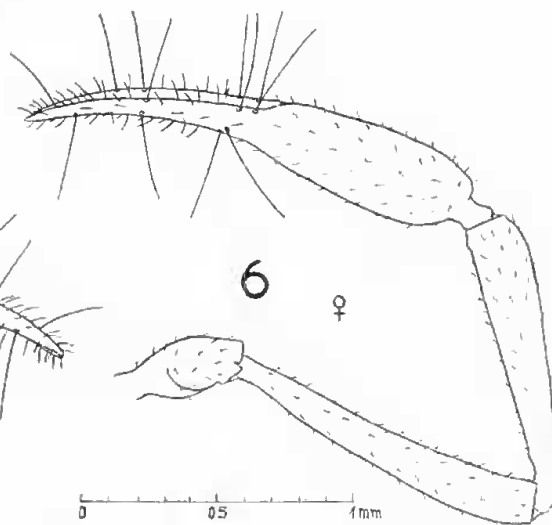
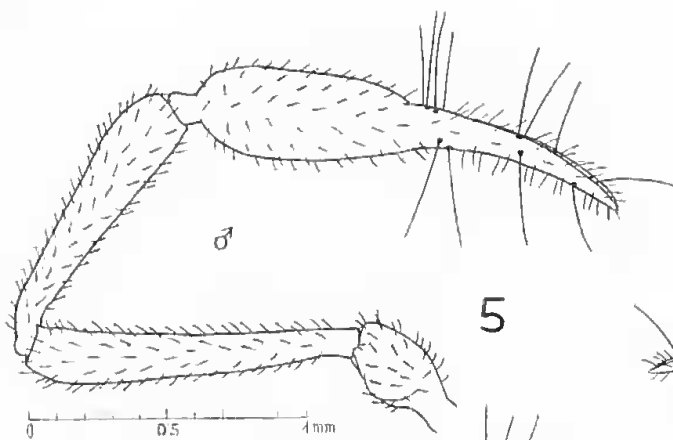
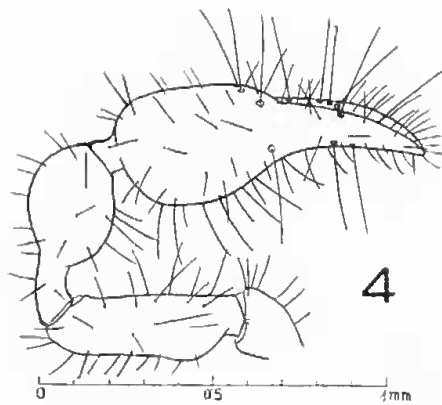
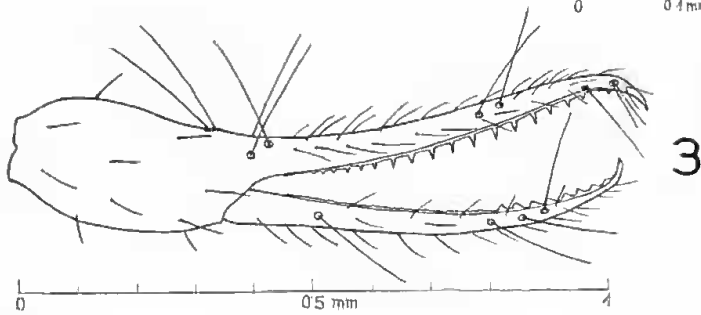
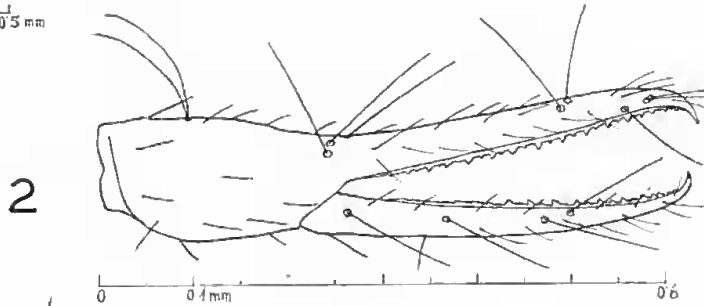
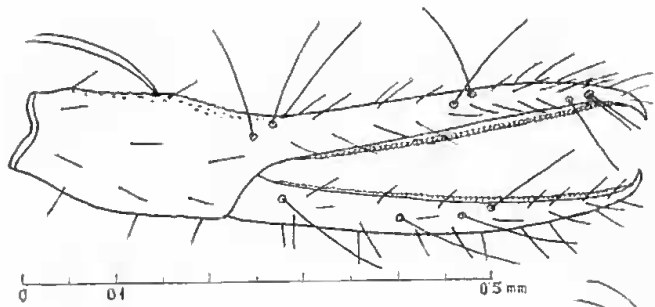
Carapace: length 0.51-0.52 mm., breadth 0.54-0.55 mm.

Pedipalps: length femur 0.74 mm.; length hand 0.38 mm., breadth hand 0.22 mm.; length fingers 0.70 mm.

Holotype—1 ♀ Mt. Widderin Cave, Skipton, Victoria, 16.XI.1964, E. Hamilton-Smith, dep. S. Austral. Mus. N196830.

The new species is closely related to *P. solitarius* (Hoff) and *P. bornemisszai* Beier, both from Victoria, but not cave-dwelling. It is easily recognizable by the presence of 7-8 very broad distal teeth of the movable palpal finger. *P. hamiltonsmithi* differs, moreover, from *solitarius* by the size being twice as big, the long and finely prickled epistome, fewer teeth of movable palpal finger, and more coxal spines, and from *bornemisszai* by smaller size, by the dentation of the fixed cheliceral finger, relatively longer palpal fingers, more teeth of movable palpal finger, and by the chaetotaxy of abdominal tergites 3 and 4.

- Fig. 1. *Austrochthonus cavicola* sp. nov., ♂, chela laterally.
 Fig. 2. *Morikawaia trogliphila* sp. nov., ♀, chela laterally.
 Fig. 3. *Pseudotyranochthonus hamiltonsmithi* sp. nov., ♀, chela laterally.
 Fig. 4. *Ideobisium antipodum* (Sim.), ♂, left pedipalp.
 Fig. 5. *Protochelifera naracoortensis* sp. nov., ♂ and ♀, left pedipalp.
 Fig. 6. *Protochelifera cavernarum aitkeni* ssp. nov., ♀, right pedipalp.



Ideobisium antipodum (Simon)

Fig. 4

Obisium antipodum Simon, 1880, Ann. Soc. ent. Belgique 23 CR: 174.

Ideobisium antipodum, Beier, 1932, Das Tierreich 57: 160.

One ♂, Grotte de Ninrin-Reu, near Poya, New Caledonia, 28.XII.1965, E. Hamilton-Smith (BS1310).

The single male specimen before me belongs certainly to this species described more than 80 years ago and since never recorded. The original description can be completed as follows:

Relatively big. Carapace and pedipalps intensively reddish brown, abdomen pale reddish yellowish-brown. Carapace a little longer than broad, smooth; its integument with an irregular and broad transverse zone of windows near the middle, a transverse row of small windows between the latter and the posterior border, which ends on both sides with a big window, and with a double longitudinal row of windows in the prozona; disc with 18 bristles, of which 4 are on the anterior and posterior border respectively; anterior border with a broad ridge roundly projecting orally. Eyes very close together, the anterior ones shallowly vaulted and about $1\frac{1}{2}$ diameters distant from the anterior border, the posterior ones flat, but scarcely smaller. Abdominal tergites 1-4 and 10-11 each with 6, the others with 8 bristles. Ultimate tergite with tactile bristles laterally. Palm of chelicerae with 5 bristles, *ES* short. Fixed cheliceral finger finely and sharply denticulate, movable finger with 7 big teeth distally and 2 small denticles proximally. Galea long and slender, simple, slightly curved. Galeal bristle reaches the tip of the galea. Pedipalps robust, absolutely smooth. Femur very shortly and abruptly pedicellate, 3 times longer than broad, thickened laterobasally. Tibia 2.2 times longer than broad, with the pedicel slender and rather long and the club strongly swollen. Hand 1.6 times, chela with pedicel 2.9 times, without pedicel 2.7 times longer than broad. Fingers as long as hand without pedicel. Distribution of tactile setae as typical for the genus. Sub-terminal bristle of tarsi with a very fine denticle subapically.

Body: length ♂ 2 mm.

Carapace: length 0.56 mm., breadth 0.51 mm.

Pedipalps: length femur 0.58 mm., breadth femur 0.19 mm.; length tibia 0.55 mm., breadth tibia 0.25 mm.; length hand 0.55, breadth hand 0.34 mm.; length fingers 0.48 mm.

The species is distinguishable from *I. peregrinum* Chamberlin from New Zealand by the chaetotaxy of carapace, the better developed and contiguous eyes, stouter palpal joints, longer stalked tibia, longer fingers, and

almost simple subterminal bristle of tarsi. It differs from *I. pugil* Beier from the Solomon Islands by the much bigger size, the smooth palpal femur, and the longer fingers.

***Protochelifer naracoortensis* sp. nov.**

Fig. 5

Carapace, pedipalps, and legs rather pale reddish-brown, abdominal tergites brownish. Integument very densely and uniformly granulate. Vestitural bristles relatively long in general, the dorsal bristles of body and the medial bristles of palpal trochanter and femur distinctly clavate, the others finely dentate apically. Carapace distinctly (nearly 1.3 times in the male) longer than broad, very densely granulate, without bigger granules, with the bristles clavate and dentate, rather short, but the anterior and posterior border bristles longer; both transverse furrows rather deep, the anterior one sharply incised, the sub-basal one more than twice as far from the anterior furrow as from the posterior border; the latter with 13-15 bristles; posterior corners not angulate in the male. Eyes well developed. Abdominal tergites densely transversely granulate, all divided in the female, the first undivided in the male, but without spines. Half tergites mostly with 9 posterior border bristles, the third (♀) or fourth (♂) and those following with an additional lateral border bristle. Ultimate tergite with about 10 marginal bristles, 2 discal bristles, and 2 rather short tactile bristles discally near the middle of each half tergite. The vestitural bristles distinctly clavate and gradually longer on the posterior segments. Sternal bristles acute, but dentate or slightly clavate on the posterior segments. Ultimate sternite with 2 short tactile bristles discally. Palm of chelicerae regularly with 5 acute bristles (occasionally with a supernumary bristle), *ES* very long, longer than *B* or *SB*. Galea almost simple in the male, with 5 acute apical branches in the female. Pedipalps very slender, densely and rather coarsely granulate, with numerous rather long bristles, which are distinctly clavate on the medial side of trochanter and femur, but dentate only elsewhere. Trochanteral humps round. Femur weakly pedicellate, gradually clavate distally, in the male 6-6.2 times, in the female 5.7-5.8 times longer than broad. Tibia also gradually clavate behind the short pedicel, broadest distally, 4.4-4.6 times longer than broad. Hand narrowly ovate, especially in the male, 2.2 times (♀)—2.6 times (♂), the whole chela with pedicel 4.3 times (♀)—5.1 times (♂), without pedicel 4 times (♀)—4.8 times (♂) longer than broad. Fingers as long as hand with pedicel or (♀) scarcely shorter. Disposition of tactile setae typically for the genus, *ist*, therefore, almost opposite *est* near the middle of the fixed finger, *it* far distally, *st* of the movable finger approaching *t*. Hind coxae of male densely setose medially, without coxal sacks, but with a pore, which bears a short membranaceous

tube. Ramshorn organs scarcely developed. Legs very slender, hind femur but slightly broadened proximally. Hind tarsi without tactile bristle. Sub-terminal bristle and claws simple.

Body: length ♂ 2.7 mm., ♀ 3.3-3.4 mm.

Carapace: length male 0.95 mm., female 0.98 mm.; breadth male 0.75 mm., female 0.85 mm.

Pedipalps: length femur male and female 1.20 mm., breadth femur male 0.20 mm., female 0.21 mm.; length tibia male 1.06 mm., female 1.11 mm., breadth tibia male 0.23 mm., female 0.25 mm.; length hand male 0.85 mm., female 0.89 mm., breadth hand male 0.33 mm., female 0.40 mm.; length fingers male and female 0.85 mm.

Holo- and allotype: 1 ♂, 1 ♀, Bat Cave, Naracoorte, S. Australia, 16.VI.1962, E. Hamilton-Smith, dep. S. Austral. Mus., NI96831 and 32.

Paratypes: 12 ♂, 5 ♀, 6 nymphs, Bat Cave, Naracoorte, 5.XI.1961, 16.II., 16.VI., and 9.IX.1962, E. Hamilton-Smith (BSOO31, BSOO32, BSOO33, BSOO34, BSOO35, BSO197); 2 ♀, 2 nymphs, Bat Cave, Naracoorte, 5.VIII.1962, P. Aitken (BSO246).

The new species is closely related to *P. cavernarum* Beier from N.S.Wales, Victoria, and W. Australia and agrees with it in the clavate tergal bristles. It differs, however, from the latter in the relatively longer carapace, which does not bear larger granules, in the somewhat less slender pedipalps, and in the much longer, thicker, and stronger clavate medial vestitural bristles of pedipalps.

***Protochelifer cavernarum* Beier**

2 ♂, Cliefden Caves, N.S.Wales, 27.I.1963, J. Davidson (BSO240); 2 ♂, 3 ♀, 3 nymphs, Ashford Cave, N.S.Wales, 1963 and 8.II.1964, K. Angel and E. Hamilton-Smith (BSO509 and BSO505); 1 ♂, 2 nymphs, Clogg's Cave, East Buchan, Victoria, 24.XI.1962 and 13.IV.1963, E. Hamilton-Smith and G. Sinclair (BSO167 and BSO318); 1 ♂, 3 ♀, 13 nymphs, Gooseberry Cave, Jurien Bay, W. Australia, 11.I.1965, E. Hamilton-Smith (BSO878).

This species was hitherto only known from N.S.Wales.

***Protochelifer cavernarum* ssp. *aitkeni* nov.**

Fig. 6

Carapace and pedipalps pale reddish brown, abdominal tergites yellowish brown. Carapace and pedipalps, the hand inclusively, very densely granulate, abdominal tergites finer squamosely sculpturate. Vestitural bristles short and relatively sparse, the dorsal bristles of the body

dentate and slightly clavate, the medial bristles of pedipalps blunt and with a subapical denticle, the lateral bristles of pedipalps shorter, very thin, and acute. Carapace 1.2 times (♀) to 1.3 times (♂) as long as broad basally, slightly narrowed orally; the submedian transverse furrow sharply incised and deep, the subbasal one shallower, granulate, and more than twice as far from the anterior furrow as from the posterior border; hind corners simple in the male. Eyes with lens flatly vaulted. All abdominal tergites divided. Half tergites of the two anterior segments each with 6 marginal bristles, the others mostly with 5 posterior border bristles and 1 lateral border bristle, without median border or discal bristles. Half tergites of ultimate segment with 4 marginal bristles, of which the second one from the median line a moderately long tactile bristle. Ultimate sternite with short tactile bristles in the same position. The other sternites mostly with 6 acute posterior border bristles. Palm of chelicerae with 5 acute bristles, *ES* longer than *B* or *SB*. Galea with 3 terminal and 1 subapical branches. Galeal bristle reaches almost to the end of the galea. Pedipalps very slender. Trochanteral humps flatly rounded. Femur indistinctly pedicellate, gradually broadened to the end, broadest distally, 6.2-7 times, tibia 5-5.4 times, hand 2.7-2.8 times, chela with pedicel 5.3-5.7 times, without pedicel 5-5.4 times longer than broad. Fingers as long as hand with pedicel or but a little longer. Disposition of tactile setae as in the nominate form. Tibia of fore legs straight.

Body: length ♀ 2.5-3 mm.

Carapace: length 0.98-1 mm., breadth 0.75-0.85 mm.

Pedipalps: femur length 1.18-1.22 mm., breadth 0.18-0.19 mm.; tibia length 1.12-1.13 mm., breadth 0.21-0.22 mm.; hand length 0.88-0.91 mm., breadth 0.31-0.33 mm.; fingers length 0.89-0.95 mm.

Holotype: 1 ♀, Abrakurrie Cave, Nullarbor Plain, W. Australia, 13.I.1964, P. Aitken, dep. S. Austral. Mus., N196838.

Paratypes: 2 ♀, 1 Tritonymph from the same locality.

Differs from *cavernarum* s. str. in the smaller size, less numerous tergal bristles, the flat trochanteral humps, and the straight tibiae of the fore legs.